Fifty Years Service

AMERICAN PULPWOOD ASSOCIATION INC.
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TECHNICAL RELEASE
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HYD-MECH FB7 SHORT ROTATION HARDWOOD FELLER-BUNCHER TEST

Harvesting 4.2711

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INTRODUCTION: The FB7 is a first-generation prototype continuous feller-buncher manufactured by Hyd-Mech Engineering, Ltd. of Woodstock, Ontario. It was developed and funded by the National Research Council of Canada to harvest short-rotational bioenergy plantations of hybrid poplar. The development specifications were for stumps with diameters of up to eight inches and with a continuous harvesting speed of 1.5 mph in rows with trees ten feet apart. The carrier, an articulated, four-wheel drive tractor with a 60-horsepower, turbo diesel engine, was manufactured by Versatile Farm Equipment Company of Winnipeg, Canada.

OPERATION: Two counter-rotating, horizontal, 24-inch, 2,000-rpm saws are the cutting mechanism for the prototype felling head. There are two accumulators, one on each side of the head. Cut stems are forced through holding gates with hydraulic arms into either accumulator. When the accumulator is full, it is rotated to dump the bunched trees alongside the feller-buncher, parallel to the direction of travel. The two accumulators allow unloading to either side, away from the stand, for clear passage on the next following runs. Cutting and dumping are accomplished without stopping the forward movement of the machine.

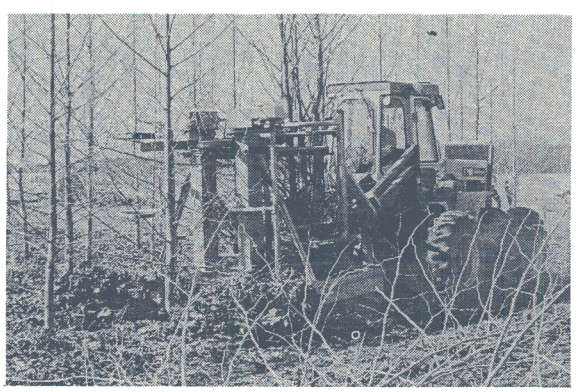

Fig. 1: The FB7 harvesting three-year-old sycamore.

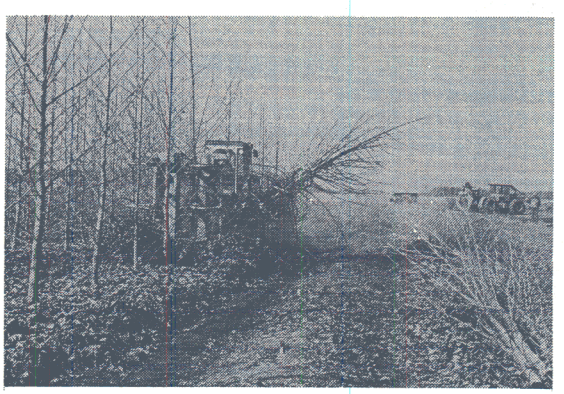

Fig. 2: The FB7 off loading a bunch while continuing to harvest more.

Operation of the felling head is controlled by an onboard computer system. An OMRON SYSMAC S6 programmable controller operates the arms that push trees from the cutting area into the accumulating area and the dumping sequence. Sensors located in the cutting opening and on the accumulators initiate operating cycles of the accumulating devices. This leaves the operator relatively free to drive the machine at a continuous speed. The operator decides when to initiate the dumping sequence.

TESTING: The test was conducted near Atmore, Alabama on one of Scott Paper Company's test plantings of three-year-old sycamore. Trees were approximately six feet apart in rows spaced ten feet apart.

While cutting a row, the FB7 cut and bunched an average of 1,057 trees per productive machine hour (PPMH). Counting a turnaround time at the end of each 400-foot row brought the figure down to 850 PPMH.

Table 1: Hyd-Mech Production Summary.

Item	Observations	Mean	Deviation	Range
Productive minutes per bunch cycle	56	0.298	0.095	0.179 - 0.600
Trees per cycle (bunch)	56	5.1	1.50	3 - 10
Trees per productive hour[1/]	56	1056.7	194.08	466.00 - 1457.0
Distance between bunches (ft)	56	28.8	7.40	15.40 - 51.10
Productive cutting speed (mph)	56	1.08	3.14	0.42 - 1.89
Delays[2/]	6	0.289	0.173	0.036 - 0.405
Turnaround (min)	4	0.455	0.122	0.336 - 0.622
Tree spacing (ft)	559	5.88	3.37	0.60 - 51.80
Diameter breast high (in)	568	2.48	0.63	0.40 - 4.80
Diameter stump level (in)	203	3.71	0.87	1.10 - 6.00
Green weight per tree (lb)	568	45.0	28.80	5.50 - 330.80

[1/] Does not include turnaround time at end of row or delays; based on cycles.

[2/] Delays are only those where trees hung during cutting or dumping. Delays not included were mechanical delays, such as hydraulic problems, broken switch pins, and cleaning head.

For more detailed information and specifications, contact: Stan Jasinski, President, Hyd-Mech Engineering, Ltd., 239 Beards Lane, P.O. Box 1030, Woodstock, Ontario N4S 8A4, CANADA.

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